

UNITED STATES DEPARTMENT OF AGRICULTURE, DIVISION OF AGROSTOLOGY.

[Grass and forage plant investigations.]

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[Corn is everywhere the king of fodder crops, and cowpeas are to the South what the clovers are to the North. One supplements the other, and combined as they may be in the silo, they constitute a ration of high feeding value. The practical possibility of growing and harvesting the two crops together is set forth in the present circular prepared at the request of the Secretary of Agriculture by Mr. W. Gettys, a prominent and successful farmer and dairyman of Tennessee. His methods of handling cowpeas and corn for silage and fodder will be of interest to every farmer in the South who is seeking improved systems of farming and stock feeding.—F. L.-S.]

COWPEAS AND CORN FOR SILAGE AND FODDER.

OBSERVATIONS ON CORN AND PEA STOVER.

In the South, at least in Tennessee and some of the other border States, the silo has become a necessity to the dairyman and live-stock breeder. It is the compensating hand of nature reaching out to us and making good some of the natural deficiencies found in our Southern agriculture, and enabling us to compete successfully with the West in making beef and butter. Nothing can fill up the gap made by a short summer crop, bridge over a fall drought, or draw reluctant spring into the lap of winter so well as good silage. When the spring floods have drowned out the regular crops on the lowlands or so delayed their growth that they will not mature in due season, then the silo comes to the planter's relief and enables him to utilize his crops, as he can in no other way, before they are caught and ruined by the early frost. Or should the drought cut short his hay crop, he still has the chance at some of the numerous catch crops, such as sorghum, millet, cowpeas, and corn. Any of these forage plants, if the season is at all favorable, will advance far enough to make a fair crop of silage. Low, wet, bottom lands that remain useless for anything else till midsummer can profitably be used in this way. Even large

mill ponds, that are in the winter and early spring seasons applied to grist and saw-mill power, may be dried off in the late spring and their beds cultivated in time for a crop of corn silage. The soil of such lands is especially rich in all the elements requisite for large yields of such crops. To convert these catch crops that I have named into hay is, in our uncertain climate, a very unsatisfactory, and often a very unprofitable, part of the farmer's work. It requires a succession of hot, dry days to cure for safe-keeping such coarse provender, and even when hay caps are resorted to, the crop is badly damaged if the weather takes an unfavorable turn before it is put under shelter. But all these ills may be cured, regardless of the weather, by the use of the silo.

Many silage growers secure fairly successful yields by turning early wheat stubble land and sowing cowpeas, and succeed in getting the crop into the silo before frost. This is an uncertain dependence, for its success hangs on having a good growing season all through. Yet it rarely fails to pay the expenses of the effort, because if the season is such as will not make mature silage or hay, the planter will have valuable late pastures for his stock and the land will be benefited by the peas and be ready for another crop of small grain without further plowing. No other kind of stock food, green or dry, grain or stover, will make milch cows respond at the pail and churn so readily as a late growth of peas pastured off in the fall at a time when everything else seems to fail to arrest the natural tendency of the cow to decrease her flow of milk. The dairy product, however, will be somewhat unfavorably affected in its flavor by too much of this feed.

During the fifteen years that the writer has been using the silo he has endeavored to ascertain the best kind of crop for silage, and in doing so has grown nearly all the forage plants that were thought to be adapted to this climate and soil, taking into consideration always the quality as well as the quantity of the product, and the purposes for which that product was to be used. viz. making winter food for a breeding herd of dairy cows.

SORGHUM UNDESIRABLE FOR SILAGE.

The several kinds of sorghums have been tried under the different methods of planting and cultivation, and while the production was large, the quality of the silage was not good.

COWPEAS ALONE NOT SATISFACTORY.

Most of the varieties of cowpeas have also been tried and found, when grown alone on rich soil, expensive to handle and injurious to the flavor of a first-class dairy product, although among the best for a large production of milk and butter and for feeding beef and stock

cattle. Probably no other kind of silage will carry dry cattle and young stock through the winter in such fine appearance as will that made from cowpeas.

CORN ALONE TOO EXHAUSTING TO THE LAND.

Corn alone, as we grow it for the silage in the South, is, perhaps, as nearly a perfect, all round silage crop as is possible to be had, but it is exhausting to the soil. To remedy this objection the effort was made to find some forage plant that would grow well with the corn and, while adding quality and quantity to the yield, would add nitrogen to the soil. For this purpose tests were made with various legumes and a suitable crop found in the cowpea which adds quantity to the crop, and being a renovater of the soil and a conserver of its fertility, counteracts or counterbalances the exhausting effects of the corn on the land. Especially is the question of soil renovation important to the South now, since of late years it has become next to impossible to secure a stand or a good crop of red clover, even on land that once grew enormous yields of that most valuable forage plant. In this agricultural emergency the cowpea has become a boon to a large section of the South for both hay and silage, and the area in cultivation has widened in Tennessee wonderfully within the last few years.

Some writers have doubted the advisability of growing cowpeas for ensilage on account of its alleged inferior quality as food. But the writer's experience leads him to believe that if the crop is grown properly, harvested at the right stage of maturity, evenly mixed in the silo with an equal portion of corn, and fed in connection with good hay or other provender, the quality of the combined crop will produce milk and butter of first-class quality, which is well known to be the most severe test that can be applied to any cattle food. The question of the quality of the silage is of much importance, since the last five years have witnessed a great increase in the number of silos built and used in the South, especially in east Tennessee, and perhaps the greater part of their contents is fed to dairy cattle, a class of stock that demands the best of health-giving food, and whose dairy product must be of unexceptional quality.

WHIP-POOR-WILL PEA THE BEST.

Of all the varieties of cowpeas the whip-poor-will has been found the best for silage purposes, because, when planted with corn, it grows rank enough; does not entangle the corn so much as the others, and hence damages it less; is the most easily harvested, and in this climate and soil yields more grain and ripens its vine more uniformly than the ranker growers, such as the "Clay," "Unknown," "Wonderful," and other runners. The "Whip" pea, strictly speaking, is a bunch

pea and not a climber or runner, but with us, in favorable soils and seasons, it does climb in many instances as high as 10 feet, and bears fully matured pods in profusion to the top.



FIG. 1.—Three stalks of corn covered with a growth of whip-poor-will cowpeas.

AN IDEAL TENNESSEE CROP FOR SILAGE DESCRIBED.

My own silage crop of “Whip” peas and corn grown together the past season was, to all appearances, an ideal one. A 20-acre field of chocolate land, lying in, and on the slopes of the valley, was well

broken and prepared, and the corn planted the middle of May without fertilizer. The corn, a large Southern variety, was put in with a one-horse drill, in rows $4\frac{1}{2}$ feet apart and from 9 to 16 inches apart in the row. This width of row was given to admit plenty of sunshine and air. After the first cultivation and during the first days of June, when the corn was about 6 inches high, the peas were planted between the corn and in the same row with the corn, with a hand planter, commonly used for replanting purposes. The delay in planting the peas is deemed necessary to give the corn a good start ahead of the peas, the latter being of more rapid growth. If the corn rows are straight the peas may be put in more expeditiously with the one-horse drill, if care is taken to keep the same close up to the corn row; the object being to have both crops grow so as to be harvested together with the corn harvester, and bound into bundles, without waste, ready for the wagons. The season was favorable for both corn and peas, the stand was good, and after three cultivations the crop was all that could be desired. I have seen larger crops of both, when grown separately, but never such a yield of grain and provender of both plants combined and in such perfect condition for harvesting quickly and economically. The corn stood up well, and the peas, confining themselves to the row, grew over much of the field to the base of the corn tassel, fully grown and matured pods being found on the vines 10 feet from the ground.

The accompanying cut (Fig. 1), showing a man of ordinary height standing by the stalks, gives a fair idea of the growth of the crop. The harvesting began September 8, when the grain of the corn was beginning to glaze and when three-fourths of the pea pods were ripe, using a corn harvester (with four mules attached) that cut and bound the crop in bundles ready for the silage cutter. Few noxious weeds or grasses could stand under such a growth, so that after a satisfactory harvest and a few days of gleaning by the herd of cows the field was ready, without further preparation, for the disk harrow and wheat drill, and is now covered by what promises to be a very good and very cheaply grown crop of wheat. This land is ordinarily good for a yield of from 40 to 50 bushels of corn and from 18 to 25 bushels of wheat per acre. From this year's crop a considerable portion of the riper grain was pulled from the corn before cutting, for fattening hogs, hence no estimates were made by which the weight of the crop could be indicated, a fact I now regret. Doubtless comparative failures of this silage crop will now and then occur, as with all crops, but I am sure, from my own experience of several years, that all good corn-growing seasons will bring paying yields of this combination, grown as above described, and it will meet more fully than anything else of the kind the wants of the Southern silage grower.

SILOING AND FEEDING THE CROP.

The crop was put into the silos in the usual way. The field being half a mile away, four two-horse wagons, with one hand to each wagon and two, sometimes three hands, loading, were required to keep the cutter going. The knives were set to cut half inch in length, the cutter being preferred to the shredder, because it did its work more cheaply and quickly. The silos being side by side, the work of filling was all done at one setting of the cutter by simply shifting, when required, the table chute at the top of the carrier over the pits, and were both filled as nearly at the same time, as possible, on alternate days, so as to allow the contents to heat and settle. In this way a greater quantity can be put in the same space. Two men were kept in the pits all the time, tramping the sides well. When full the contents were covered with some of the chaffy, less valuable part of the same material, without putting on any weights. They were well tramped once a day for a week, after which they were let alone till time for using.

The feeding should begin at the top, using the windows in the sides for removing the silage as the pits are emptied. This crop of silage, as that of former years, has kept well, comes out of the pits with fine color and flavor, and is much relished by the cows, about 40 pounds a day, in two feeds, being allotted to each cow. As silage of any kind, of itself, is not considered a perfectly balanced ration, the cows receive in addition, during the winter, 4 quarts of wheat bran, 2 quarts of corn meal, and 1 pound of cotton-seed meal, night and morning, together with one feed of corn-and-pea stover. Good clover hay would be preferred to the roughage named, if it could be had. In feeding a breeding or dairy herd during the winter, silage, however good or plentiful, should always be supplemented by some kind of mill feed and well-cured hay or other stover. When the increase of the herd is the greatest consideration, the cows forward in calf and the breeding bulls should be given silage sparingly.

THE QUALITY OF THE SILAGE ON TRIAL.

The quality of this kind of silage and its influence on the character of the dairy product are now receiving a fair trial. The cows are apparently in perfect health, and the cream from the herd averages $33\frac{1}{2}$ per cent of butter fat. A portion of this goes to a near-by city, where it is scientifically manufactured into various kinds of food for the table. The balance is made into butter and sent to customers in a Southern city, some of whom have been using my product for eighteen years. Thus far no complaint from either source has been heard and none is anticipated.

THE GROWING CROP DIVERTED TO OTHER USES.

Should there be, as there was in the writer's case, more of the standing crop of corn and peas grown together than is needed for silage, as already described, it can be very profitably used as a dry provender. Allow the crop to stand till the proper stage of maturity is reached, which is shown by the brown husk of the corn and the yellow leaves and ripe pods of the pea vines. Then cut with a corn harvester and shock as with ordinary corn, putting about sixteen hills to the shock. To guard against molding at the center, go through the field two or three days ahead of the harvester and make small shocks, which will give a dry nucleus or center to the main shock and prevent all danger of damage. See that all shocks stand up well, and that they are well tied together at the top with binder twine. Select dry, cool weather in November or December, the sooner the better, provided the cornstalks are dried out enough to keep in the mow, then haul to the barn and run the crop through the "corn shredder and husker." In one operation the peas will be knocked from the pods and carried, with the small proportion of corn that is shelled in the process, into sacks to be taken to the mill and ground for stock food; the ears of corn husked and dumped into the wagons, to be carried to the crib; and the corn fodder and pea vines torn to pieces and conveyed up through the blowpipe into the hayloft, to be used as winter stover. Such stover is now being fed, in connection with silage, with as good results, and with as little waste as would be with the ordinary hay, such as is made and sold in this part of the country. The work mules and dry cattle get no other roughage and do well.

ALWAYS PLANT PEAS WITH THE CORN.

Considering this necessity of growing corn in some manner for live-stock food and as a rotation crop, the planter should aim to secure as large yields of provender to the acre as possible with a minimum amount of exhaustion to the soil. Therefore none of our uplands in the South, and particularly within the bounds of what is known as the "Piedmont region," where the cowpea seems to have its home, should be put into corn without peas being planted with it. This advice will hold good, whether the crop be intended for silage or dry provender. Peas add to the quality, as well as to the quantity, of the yield and restore to the soil its fertility. To harvest and put away this combined growth quickly and economically requires improved agricultural implements that are especially adapted to the purpose, such as the corn harvester, silage cutter, and corn shredder and harvester. These every well-to-do stock grower and farmer should own or be able to hire.

COWPEA HAY FROM STUBBLE LAND.

It may be of interest and some benefit to Southern stockmen and planters to recount here the experience of the writer in growing a catch crop of pea hay from stubble land. The wheat was taken off as early as possible after harvest, and in June the land was turned and well harrowed and rolled, the season being favorable for such work. Whip-poor-will peas, a bushel to the acre, were sown with an ordinary wheat drill. The seed being defective, the stand was not good, but the growth was rapid and promised a rich crop of grain. As harvest time approached the thought occurred to the writer that, while there might be a medium-sized crop of good hay secured from the land, cut and put away in the usual manner, there should be more of the grain saved and utilized than is possible when the crop is handled as ordinary hay, knowing from past observation that much, if not most, of the grain is scattered and lost by the time the hay reaches the feed manger. If peas are to be our dependence in the future, in the absence of clover, we must discover the best method of reaping the greatest benefit from their production. The crop was permitted to stand before cutting a few days longer than it would have been for making hay, so as to give a greater proportion of the pods time to ripen. It was then cut with a mower and let lie in the hot sun thirty-six hours, when it was thrown into light windrows with a hayrake, the raking being done after sunset, sometimes by moonlight, when the plant was tough, to avoid shattering the leaves and grain. After remaining in the windrows twenty-four hours, it was thrown into small cocks and left exposed to the sun and air for thirty-six hours longer, when it was loaded on wagons and taken to the barn. No thrasher suitable for the work being available, the crop was run through the silage cutter. The cutter had a shredder attachment, but this, requiring too much speed, was removed and the cutter knives used as with silage. To save the thrashed peas separately from the stover was the next problem encountered. For this purpose a section 8 feet long was cut out of the bottom of the carrier and a suitable wire screen tacked in place of the solid bottom, which allowed the peas to drop through into a wagon bed on the ground underneath, while the pea stover was carried on up 36 feet into the barn loft, where it was well scattered and mixed with other dry feed.

The peas were damaged but little in the process, and after being run through a hand pea cleaner were spread out on a granary floor to dry a few days before sacking. The hay was not so good as it would have been if cut earlier, but this was more than counterbalanced by the money value of the peas secured, which was greater than the value of the wheat crop just removed. The land was much benefited by the growth of the peas, and required only the doubling of the disk harrow

to prepare an excellent seed bed for the wheat that was to immediately follow. Inasmuch as wheat was to follow wheat, the greater part of the labor and expense of this catch crop of peas was but the preparation of the land for the succeeding crop of wheat, leaving a very small expense account chargeable to the crop of peas. Of course, the harvesting and housing of the crop in this manner required favorable weather, but not more so than would have been required to put away successfully the crop in the ordinary way. In such work as this the planter is more or less dependent on the weather for his success, this being one of the incidents of his calling.

If it were possible again to grow such fine crops of clover on the lands in Tennessee, and elsewhere in the South, as we secured years ago,

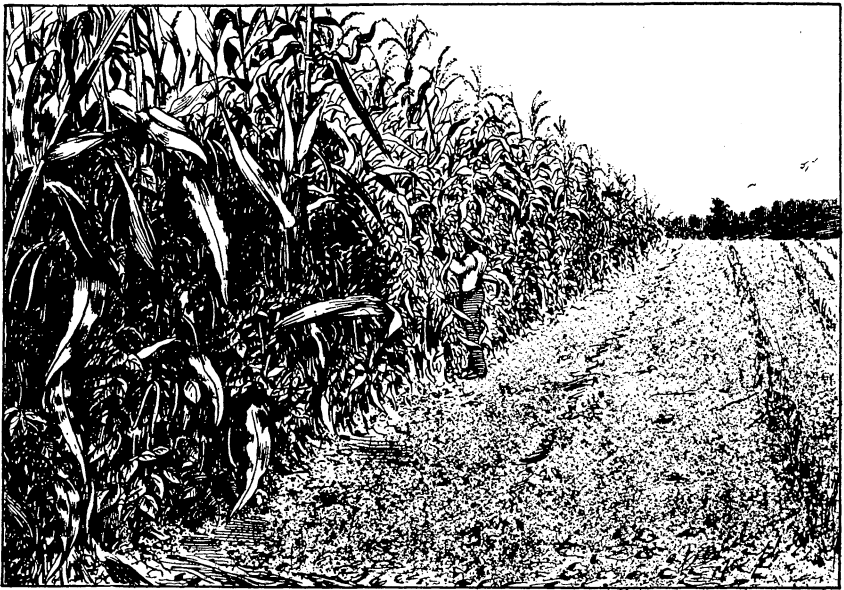


FIG. 2.—A field of corn and whip-poor-will cowpeas.

the questions discussed and experiences given in this paper would be of less importance than they are now. But as this can not be done, and as the cowpea has come to be regarded as the substitute for clover, for the purpose of fertilizing and renovating the soil, and for furnishing food for live stock, the planters and stock growers in these States are compelled, by self-interest, to study the question in all of its bearings, in order to ascertain the best manner of cultivating and saving this crop. And the question is made more important by the fact that this substitute is so varied in its useful purposes and capable of serving the planter in so many different kinds of combinations with his other farm crops. The writer's advocacy of the cowpea for the needs of the South and his reasons for growing and using it in so

many ways are not based on a study of any scientific analysis giving its comparative feeding value for stock. He has been content in consulting only the good effect the plant has produced for him, as shown in the marked improvement of the soil, the continued good health of his cattle, and their increase, and the quality and quantity of their product at the pail and churn. All of which observations and experiences lead to the belief that no single grain of the plant was ever cast intelligently into Southern soil without profit to the sower.

Respectfully,

W. GETTYS.

Approved:

JAMES WILSON,

Secretary of Agriculture.

WASHINGTON, D. C., *February 26, 1900.*

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